

WHAT IS CLAIMED IS:

1. A double-sided record apparatus for forming images on both sides of a record medium, comprising:

a print head that moves relatively to the record medium  
5 and ejects ink onto a face of the record medium;

a counting unit configured to count the number of ejected ink droplets to a predetermined area on the record medium from the print head;

a comparison unit configured to compare the number of  
10 ejected ink droplets counted by the counting unit with a predetermined value; and

a determination unit configured to determine whether double-sided record of the record medium is enabled based on a comparison result of the comparison unit.

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2. The double-sided record apparatus as claimed in claim 1,

wherein to record on a plurality of record media, the determination unit determines whether double-sided record of  
20 the record medium is enabled for each record medium.

3. The double-sided record apparatus as claimed in claim 1,

wherein the counting unit is configured to count the number  
25 of ejected ink droplets to the predetermined area on each of

both sides of the record medium.

4. The double-sided record apparatus as claimed in claim 1,

5 wherein, when the number of ejected ink droplets exceeds the predetermined value as the comparison result of the comparison unit, the determination unit determines that double-sided record on the record medium is disabled.

10 5. The double-sided record apparatus as claimed in claim 1,

wherein the print head forms an image on the first side of the record medium and then forms an image on the second side of the back of the first side of the record medium, thereby  
15 forming images on both sides of the record medium; and,

when the print head forms an image on the first side of the record medium, the counting unit counts the number of ejected ink droplets to the predetermined area on the first side of the record medium through the print head.

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6. The double-sided record apparatus as claimed in claim 1,

wherein the print head forms an image on the first side of the record medium and then forms an image on the second side  
25 of the back of the record medium, thereby forming images on

both sides of the record medium; and,

before the print head forms an image on the first side of the record medium, the counting unit counts the number of ink droplets to be ejected to at least one of the predetermined area on the first side and the predetermined area on the second side.

7. The double-sided record apparatus as claimed in claim 1, further comprising:

10 an area specification unit configured to specify the predetermined area;

wherein the counting unit counts the number of ejected ink droplets to the predetermined area specified through the area specification unit.

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8. The double-sided record apparatus as claimed in claim 7,

wherein the area specification unit specifies one page of the record medium as the predetermined area.

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9. The double-sided record apparatus as claimed in claim 7,

wherein the area specification unit specifies as the predetermined area an area where the print head moves within one pass in a predetermined direction relative to the record

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medium.

10. The double-sided record apparatus as claimed in claim  
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5 wherein the area specification unit specifies as the  
predetermined area an area where the print head moves relative  
to the record medium within a predetermined time.

11. The double-sided record apparatus as claimed in claim  
10 7,

wherein the area specification unit specifies as the  
predetermined area an area in which the print head moves a  
predetermined distance in a predetermined direction relative  
to the record medium.

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12. The double-sided record apparatus as claimed in claim  
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wherein the determination unit determines that  
double-sided record on the record medium is disabled when an  
20 area exceeding a predetermined record density representing the  
number of ejected ink droplets per predetermined unit area on  
the record medium exceeds a given value.

13. The double-sided record apparatus as claimed in claim  
25 1, further comprising:

a second-side counting unit configured to count the number of ejected ink droplets to a second side of the record medium before print on the second side of the record medium; and

a cancel unit configured to cancel execution of record  
5 on both sides of the record medium based on the number of ejected ink droplets counted by the second-side counting unit when the determination unit determines that double-sided record on the record medium is enabled.

10 14. The double-sided record apparatus as claimed claim 1, further comprising:

a reversal unit that reverses the record medium to record on both sides of the record medium from a given direction;

wherein, when the determination unit determines  
15 doubled-sided record of the record medium to be disabled, the reversal unit does not reverse the record medium.

15. The double-sided record apparatus as claimed in claim 1, further comprising:

20 a recognition unit configured to recognize a type of record medium; and

an invalidation unit configured to invalidate the determination of the determination unit based on the type of record medium recognized by the recognition unit;

25 wherein double-sided record is executed when a

double-sided record command is provided, and the invalidation unit invalidates the determination of the determination unit.

16. The double-sided record apparatus as claimed in claim  
5 1, further comprising:

a recognition unit configured to recognize a type of record medium; and

a count stop unit configured to stop an operation of the counting unit based on the type of record medium recognized  
10 by the recognition unit;

wherein double-sided record is executed when a double-sided record command is provided and the count stop unit stops an operation of the counting unit.

15 17. The double-sided record apparatus as claimed in claim 15,

wherein double-sided record is executed when the invalidation unit invalidates the determination of the determination unit, regardless of the comparison result.

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18. The double-sided record apparatus as claimed in claim 15, further comprising:

a record medium type input unit to enter the type of record medium;

25 wherein the recognition unit recognizes the type of record

medium based on the type of record medium entered through the record medium type input unit.

19. The double-sided record apparatus as claimed in claim  
5 15, further comprising:

a reception unit that receives identification information indicating the type of record medium over a communication line;

wherein the recognition unit recognizes the type of record medium based on the identification information received by the  
10 reception unit.

20. The double-sided record apparatus as claimed in claim  
15, further comprising:

a detection unit that detects the type of record medium;

15 wherein the recognition unit recognizes the type of record medium based on the detection result of the detection unit.

21. The double-sided record apparatus as claimed in claim  
20,

20 wherein the detection unit includes a reflection optical sensor having a light emission element and a light reception element; and,

when the light emission element emits light to the record medium and the light reception element receives reflected light  
25 from the record medium, the detection unit recognizes the type

of record medium based on the light reception amount of the light reception element.

22. The double-sided record apparatus as claimed in claim  
5 1, further comprising:

a print delay unit configured to delay a start time until recording on a second side of the record medium after printing on a first side of the record medium.

10 23. The double-sided record apparatus as claimed in claim 1, further comprising:

an air blowing unit that blows air on one side of the record medium;

wherein print on the other side of the record medium is  
15 performed after print on the one side; and

the air blowing unit blows air on the one side where print is complete before print on the other side is started.

24. An image forming apparatus, comprising:

20 a print unit that ejects ink onto a face of a record medium to form an image thereon;

a counting unit configured to count the number of ejected ink droplets to a predetermined area on the record medium, per color;

25 a calculating unit configured to calculate the total



number of ink droplets based on the counted results of the counting unit, while weighting the counted results respectively;

a comparison unit configured to compare the number  
5 calculated by the calculating unit with a predetermined value;  
and

a determination unit configured to determine whether double-sided print on the record medium is enabled based on a comparison result of the comparison unit.

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25. An image forming apparatus, comprising:

a print unit that ejects ink onto a face of a record medium to form an image thereon;

a counting unit configured to count the number of ejected  
15 ink droplets to a predetermined area on the record medium;

a reference setting unit configured to set a reference value according to a type of image to be formed on the face of the recording medium; and

a determination unit configured to determine whether  
20 double-sided print on the record medium is enabled based on a comparison result between the reference value and the number counted by of the counting unit.

26. The image forming apparatus as claimed in claim 25, wherein  
25 the type of image includes colors of the image.

27. A double-sided record method wherein a print head for ejecting ink onto a face of a record medium is moved relatively to the record medium and images are formed on both sides of the record medium through the print head, the method comprising:

counting the number of ejected ink droplets to a predetermined area on the record medium from the print head;

comparing the counted number of ejected ink droplets with a predetermined value; and

determining whether double-sided record of the record medium is enabled based on the comparison result.

28. The double-sided record method as claimed in claim 27, wherein the determining step includes determining that

double-sided record on the record medium is disabled when the counted number of ejected ink droplets exceeds the predetermined value.

29. The double-sided record method as claimed in claim 27, further comprising:

reversing the record medium to record on both sides thereof;

wherein the reversing step is omitted when double-sided record on the record medium is determined to be disabled in the determining step.

30. A double-sided record method wherein a print head for ejecting ink onto a face of a record medium is moved relatively to the record medium and images are formed on both sides of the record medium through the print head, the method comprising:  
5 counting the number of ejected ink droplets to a predetermined area on the record medium from the print head;  
calculating the total number of ink droplets based on the counted results, while weighting the counted results  
10 respectively;  
comparing the calculated total number with a predetermined value; and  
determining whether double-sided print on the record medium is enabled based on a comparison result of the comparison  
15 unit.

31. The image forming apparatus as claimed in claim 25, wherein the type of image includes text and picture.

20 32. A print system, comprising:  
a print unit that ejects ink onto a face of a record medium to form an image thereon;  
a counting unit configured to count the number of ejected ink droplets to a predetermined area on the record medium;  
25 a comparison unit configured to compare the number of

ejected ink droplets counted by the counting unit with a predetermined value; and

a determination unit configured to determine whether double-sided record of the record medium is enabled based on  
5 a comparison result of the comparison unit.

33. The print system as claimed in claim 32,

wherein, when the number of ejected ink droplets exceeds the predetermined value as the comparison result of the  
10 comparison unit, the determination unit determines that double-sided record on the record medium is disabled.

34. The print system as claimed in claim 32, further comprising:

15 a recognition unit configured to recognize a type of record medium; and

an invalidation unit configured to invalidate the determination of the determination unit based on the type of record medium recognized by the recognition unit;

20 wherein double-sided record is executed when a double-sided record command is provided, and the invalidation unit invalidates the determination of the determination unit.

35. The print system as claimed in claim 32, further  
25 comprising:

a recognition unit configured to recognize a type of record medium; and

a count stop unit configured to stop an operation of the counting unit based on the type of record medium recognized  
5 by the recognition unit;

wherein double-sided record is executed when a double-sided record command is provided and the count stop unit stops an operation of the counting unit.

10 36. A print system, comprising:

a print unit that ejects ink onto a face of a record medium to form an image thereon;

a counting unit configured to count the number of ejected ink droplets to a predetermined area on the record medium, per  
15 color;

a calculating unit configured to calculate the total number of ink droplets based on the counted results of the counting unit, while weighting the counted results respectively;

20 a comparison unit configured to compare the number calculated by the calculating unit with a predetermined value; and

a determination unit configured to determine whether double-sided print on the record medium is enabled based on  
25 a comparison result of the comparison unit.

37. A print system, comprising:

a print unit that ejects ink onto a face of a record medium to form an image thereon;

5 a counting unit configured to count the number of ejected ink droplets to a predetermined area on the record medium;

a reference setting unit configured to set a reference value according to a type of image to be formed on the face of the recording medium; and

10 a determination unit configured to determine whether double-sided print on the record medium is enabled based on a comparison result between the reference value and the number counted by of the counting unit.

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